and cannot be resentitized. The authors believe that opsonins, like toxins and complements,. possess two groups—haptophore and opsiniferous—which act according to Ehrlich's lateral-chain theory. When various salts and formalin were applied to the mixture of leukocyte-containing fluid and bacterial suspensions, phagocytosis was materially inhibited. This action was further shown to be principally due to the effect of the salts and formalin upon the "sensitizing" serum, while there was no effect produced on the phagocytosis when these chemicals were applied to the leukocytes alone. The authors consider that these chemical substances may neutralize or bind the opsonins so that they cannot act upon bacteria. They think that antiphocytic action of this nature may be an important factor in the establishment and progress of those infections where phagocytosis is an important factor in the destruction of the organisms.

Experimental Typhoid Fever.—ATLASSOFF (*Annales de l'Institut Pasteur*, 1904, vol. xviii. p. 701) gives an account of his work upon the experimental production of typhoid fever. He first turned his attention to finding some organism which, growing symbiotically with B. typhosus, favored the growth of the latter. This was done by growing typhoid bacilli upon acid media with a variety of other organisms. It was found that the typhoid bacilli would grow on a medium containing a higher percentage of hydrochloric acid if cultivated with torula rosea, than with any other of a number of organisms experimented with, and that this organism had a decidedly advantageous effect upon the growth of B. typhosus. The growth of T. rosea did not lessen the acid reaction of the medium.

The experiments were conducted upon very young rabbits, from seven to fifteen days old, when the intestinal tract is nearly free from bacteria, making it less probable for the typhoid bacilli to encounter antagonistic organisms. Four strains of typhoid bacilli, varying in virulence, were used, and were administered by the mouth together with T. rosea. In a second series of control experiments typhoid bacilli alone were used.

Sixteen young rabbits were fed with the mixed culture, 15 of which died; 3 were fed with a pure culture of typhoid bacilli, 2 of which died. Of the 15 rabbits that died after a mixed feeding, all showed hyperæmia and punctate ecchymoses of the mucosa of the intestine, and swelling of Peyer's patches. In the cases dying on the seventh or eighth day after feedings, slight ulcerations of Peyer's patches were found. The typhoid bacillus was recovered from the blood in 12 cases, and less frequently from other organs.

The author considers that he has succeeded in producing an experimental typhoid fever much like that seen in infants, where the ulcers are rarely deep. He thinks that the method of feeding gives much better promise for investigation of the disease than subcutaneous or intraperitoneal inoculation. The organism torula rosea is frequently found in the human stomach (about 70 per cent.), and may play a definite role in the etiology of typhoid fever.

Lesions of the Aorta in Syphilis.—In Germany the question has been much discussed recently as to whether syphilis produces in the aorta lesions which are typical and characteristic of that disease. A certain type of arteriosclerosis has been described by many authors as syphilitic, and the main point at issue is the specificity of this sclerosis. CHIARI (*Cent. f. Allg. Path. u. Path. Anat.*, Band xv. p. 137, supplement) at the "VI. Tagrung der Deutchen pathologischen Gesellschaft zu Kassel" has considered in detail syphilitic disease of the aorta. As a result of an extensive research he divides arterial sclerosis in general into two types, "A" and "B." The "A" type constitutes the simple atheroma and begins in the intima. It is characterized by a swelling of the tissues, a proliferation of the local cells, fatty degeneration, and, later, regressive alterations leading eventually to the well-recognized endarteritis chronica deformans. The media and adventitia may undergo certain changes which, however, are always secondary to the disease of the intima. The "B" type of sclerosis is quite different. In this group the media and adventitia, instead of the intima, are the primary seats of disease. The surface of the aorta, macroscopically, presents marked irregularities, with corrugations, crevices, clefts, and pittings. The intima is thickened, but there is no calcification; and, further, it is to be distinguished from the "A" type by its localization in the ascending aorta and arch, the abdominal aorta being practically immune. Microscopically the media is found to be the main seat of disease. Through this coat are found small inflammatory areas, formed partly of accumulations of small round cells lying especially about the vessels, which are increased in numbers, partly by granulation tissue or fibrillated connective tissue. Giant cells of the Langhans type may be present or areas of necrosis may form the centre of the inflammatory foci. With the development of connective tissue there is a tendency to shrinkage, and thus are produced the macroscopic scarrings and corrugations over the surface of the aorta. The adventitia likewise presents inflammatory changes combined with a periarteritis and endarteritis proliferans of the vasa vasorum. To this type of affection the author gives the name of "Productive Mesaortitis." The study of a long series of cases of syphilis and progressive paralysis showed that the productive mesaortitis was present in more than half of the instances of undoubted syphilis, and in 47 per cent. of the cases of progressive paralysis. The author concludes that syphilis stands in direct causal relationship to this variety of arterial sclerosis, although with our present knowledge of this disease other etiological factors cannot be excluded. Nevertheless, the finding of a productive mesaortitis must make one think of syphilitic disease of the aorta.

In the same number of the *Centralblatt*, Benda (page 164) discusses the etiological relationship between syphilis and aneurysms. From an exhaustive critical review of the literature and a study of 6 cases of aneurysm he concludes that the small arteries and thoracic portion of the aorta are particularly susceptible to disease in tertiary syphilis. In the aorta the process affects especially the media and adventitia, producing in these situations a true gummatous inflammation, characterized by accumulations of leukocytes, lymphocytes, epithelioid cells, and Langhans giant cells, with destruction of the tissues of the vessel wall leading to necrosis, softening, and final scar formation. These changes produce a condition particularly favorable for the formation of aneurysms. Syphilis of the smaller and medium-sized arteries do not predispose to aneurysm, since the disease process in these vessels is obliterative.

Marchand (page 197) bases his observations on a study of 23 aneurysms. In only 3 of these cases was it certain that syphilis was present. He recognizes two principal varieties of arterial sclerosis corresponding to the "A" and "B" types of Chiari. The "B" type may, particularly in young persons, be ascribed to syphilis, but cannot be held as specific for this disease, or as a gummatous formation. In his preparation, the giant cells were interpreted as foreign-body giant cells. Further, this indurating form of sclerosis may favor the development of aneurysms but the ordinary form of sclerosis is generally associated with aneurysm.

Abramow (*Virch. Arch.*, 1904, Band clxxviii. p. 406) has found in five out of six aortas from syphilitics, which he has studied, alterations which correspond to Chiari's types of mesaortitis productiva. To decide as to the syphilitic nature of this process he examined during one year all the atheromatous aortas in the material at the "Nicolai" Stadtkrankenhaus of Rostow. From this study he concludes that syphilis in the aorta, as in other organs, may give rise to gummatous processes and ordinary cirrhotic changes, but that only the gummatous aortitis may be looked upon from an anatomical standpoint as specific. The other changes analogous to those described by Chiari cannot be termed specific and may occur in other conditions.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HARRINGTON, M.D.,

ASSISTANT PROFESSOR OF HYGIENE, HARVARD MEDICAL SCHOOL.

Standards of Ventilation.—In an address before the British Medical Association, DR. J. S. HALDANE (*Public Health*, October, 1904, p. 32) asserts that, contrary to text-book traditions, an excess of 35 volumes over the normal content of 3 volumes of carbon dioxide in 10,000 of air will have practically no effect *per se* on human beings. Experiments conducted with Mr. J. G. Priestly have shown that the percentage of carbon dioxide in the alveolar air in man "is kept constant in each individual with almost astounding precision," and that, "if the inspired air contains 50 volumes per 10,000, the change in the depth of breathing . . . is quite inappreciable to the person breathing." The increase in the proportion of carbon dioxide in the alveolar air "would certainly produce marked discomfort, if it were not so easily got rid of by a very slight increase in the depth of breathing." The deficiency of oxygen in the air of rooms he regards as of equal unimportance, and the same is true of the aqueous vapor, since the relative humidity, except in extremely close rooms and in warm weather, is usually lower inside than outside. The hypothetical volatile organic matters of respired air he regards as probably non-existent, and, therefore, devoid of influence. That they cannot be of a proteid nature, as some have asserted they are, hardly needs argument, since no volatile proteid matters have yet been discovered; and that they cannot be toxic is proved by the fact that injection of large amounts of the condensed aqueous vapor of respired air produces no more effect than that of